DOCUMENT RESUME

ED 283 615 PS 016 679

AUTHOR Brown, Marie Scott; Tanner, Christine
TITLE Type A Behavior and Cardiovascular Responsivity in Preschoolers.
PUB DATE 15 Jun 87
NOTE 23p.; This research was funded by a Biomedical Research Service grant.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Behavior Rating Scales; *Cardiovascular System; Etiology; *Heart Rate; Personality Assessment; *Preschool Children; Preschool Education
IDENTIFIERS Blood Pressure; Matthews Youth Test for Health; *Type A Behavior; *Type B Behavior

ABSTRACT

This study investigated Type A behavior in preschool children and its relation to cardiovascular reactivity. One hundred forty-four children from 3.5 to 6.5 years old were categorized by their teachers according to the Matthews Youth Test for Health (MYTH) as Type A, Mixed, or Type B. The children's pulse, pulse rate variability, and blood pressure were then measured at rest and during a challenging situation. Analysis of covariance indicated that Type A children showed a significantly greater systolic rise to challenge than did Type B children, a finding similar to that of adults and one which might be thought of as a logical precursor to adult cardiac disease. (Author)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED283615

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

Type A Behavior and Cardiovascular Responsivity in Preschoolers

Marie Scott Brown and Christine Tanner

The Oregon Health Sciences University

Authors: Marie Scott Brown, RN, PhD
Christine Tanner, RN, PhD, FAAN

This research was funded by a Biomedical Research Service Grant (# 702625502).

The authors wish to thank The Oregon Health Sciences University School of Nursing Office of Research Development and Utilization for its support and particularly Dr. Barbara Stewart, Ms. Tammy Shumann, Ms. Bridget Pricco, and Ms. Mary Williams.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Marie Scott Brown
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS 016679

Running head: TYPE A BEHAVIOR IN PRESCHOOLERS

BEST COPY AVAILABLE

Abstract

This study investigated Type A behavior in preschool children and its relation to cardiovascular reactivity. One hundred forty-four (144) children from 3 1/2 and 6 1/2 years old were categorized by their teachers according ~~the~~ to the MYTH as Type A, Mixed, or Type B. The children's pulse, pulse rate variability, and blood pressure was then measured at rest and during a challenging situation. Analysis of Covariance indicated that Type A children showed a significantly greater systolic rise to challenge than did Type B children, a finding similar to that of adults and one which might be thought of as a logical precursor to adult cardiac disease.

Type A Behavior and Cardiovascular Responsivity in Preschoolers

Type A behavior was originally defined as: "A relatively chronic struggle to obtain an unlimited number of poorly defined things from the environment in the shortest period of time possible, and, if necessary against the opposing efforts of other things or persons in this same environment" (Friedman, 1966). It is currently conceptualized as consisting of three types of behavior: competitive striving, aggressiveness, and time urgency. It was originally identified as a risk factor for ischemic coronary in the 8 1/2 year prospective investigation of the Western Collaborative Group Study, initiated in 1960 by Rosenman, Brand, Jenkins, Friedman, Strauss, and Wurm (1975). Since then these findings have received support from a variety of other sources. Jenkins, Zyzanski and Rosenman (1971); Jenkins (1976); and Jenkins, Zyzanski and Rosenman (1978) have repeatedly reviewed this work and consistently concluded that Type A behavior is definitively related to heart disease. Although not all scientists agree with the concept (Dimsdale, 1978), this conclusion was again reinforced by a review panel convened by the National Heart, Lung and Blood Institute (1980) which concluded that Type A behavior was an independent risk factor for coronary disease equal in magnitude to smoking and cholesterol level. The tinking involved in this work is detailed in a summary article.

More recently, interest has turned to Type A behavior in children. Two major questions have been addressed by recent investigators: (a) whether Type A behavior can be identified at earlier ages, and (b) whether it is associated with cardiovascular indices which can reasonably to assumed to be precursors of coronary disease. A number of studies have been successful in their attempt to categorize children's behavioral styles in a manner similar to that in which adults have been classified as Type A or Type B (Butensky, Faralli, Heebner, & Waldron, 1976; Siegel & Lietch, 1981; Wolf, Hunter, & Webber 1979). One assessment tool for categorizing children as Type A or Type B, the MYTH (Matthews Youth Test for Health), has shown acceptable reliability (Corrigan & Moskowitz, 1983; Lundberg, 1983; Matthews & Angulo, 1980; Matthews & Avis, 1983). Validity has received support from a number of studies which have found the behavior of children who are classified as Type A on these measures to be comparable to behavior of Type A adults (Matthews & Angulo, 1980; Matthews & Volkin, 1981; Matthews & Siegel, 1981).

There have also been several studies investigating the relationship between Type A behavior and cardiovascular indices which might logically be considered precursors of cardiac disease. This is an important line of inquiry since it offers clues as to the possible developmental progression of an important health factor. Although the findings are not totally consistent, work

with adults frequently indicates cardiovascular differences between Type A and Type B adults. The most common finding has been a greater increase of systolic blood pressure from a resting state to a "challenge" state. In some studies, this "challenge" state has been a physical challenge such a running (Lundberg, 1983); in others it has been a psychological challenge such as mental arithmetic (Dembroski, MacDougall, Sheilds, Petitto, Lushene, 1979; Glass, Krakoff, Contrada, Hilton, Kehoe, Mannucci, Collins, Snow, & Elting, 1980; Manuck & Garland, 1979). Three major reviews of this work (Glass & Contrada, 1982; Houston, 1983; Matthews, 1982) conclude that, with a few exceptions, these studies concur in indicating that adult Type A individuals show greater reactivity in blood pressure, pulse and plasma catecholamines than do Type B individuals.

Similar studies on children have been fewer, but show some promise. Dembroski et al., (1978) showed that Type A college students had a greater pulse rate variability at rest and higher pulse and systolic blood pressure increase when challenged than did Type B students. Lawler, Critcher and Standard (1981) studied 41 11 and 12 year-olds, and found that Type A children showed a greater systolic blood pressure, pulse rate and pulse rate variability during rest as well as a greater systolic reactivity and pulse rate reactivity to stress than did Type B children. Although these findings have not always been replicated (Hunter,

Although these findings have not always been replicated (Hunter, Wolf, Sklov, Webber, Watson, & Berenson, 1982; Murray, Matthews, Blake, Prineas, & Gillum, 1986), they suggest the early development of the cardiovascular components of Type A behavior.

One investigation, (Lundberg, 1983) focused on preschoolers. In this study, Type A children showed an increased level of systolic blood pressure to physical challenge, but not to emotional challenge. However, the salience of the emotional challenge might be questioned by those familar with preschool children; it was a pretend game in which the child pretended s/he was a bear and attempted to eat other children. Unless accompanied by external stimuli (such as a scary movie) preschool children are unlikely to actively "pretend" so totally that they activate their physiology.

The objectives of the present study continue these two major lines of inquiry with preschool age children to further explore the presence of Type A behavior in preschool age children to determine (a) if preschool age children could be classified as Type A or B; and (b) the relationship between Type A behavior to cardiovascular indices, specifically blood pressure, pulse and pulse rate variability both at rest and in response to challenge. The specific questions were:

1. Are there significant differences among Type A, Type B, and Mixed children on their resting cardiovascular pressures?

2. Are there significant differences among Type A, Type B and Mixed children on their cardiovascular measures in response to challenge?

Method

Children were categorized as Type A, Mixed, or Type B according to teacher-rated MYTH forms. Each of the children was then tested individually to determine their pulse, pulse rate variability and blood pressure while in a relaxed condition and while they were playing an exciting "Memory Game." The results were then analyzed to determine whether children who had been categorized as Type A had greater cardiovascular responses to challenge (i.e., the "Memory Game") than did children who had been categorized as Type B.

Sample

Measurement of Variables

Type A behavior was measured by the Matthews Youth Test for Health (MYTH). This tool was devised by Matthews (Matthews & Angulo, 1980) to categorize children who are too young for self report. On this tool, the teacher rates the child from 1-5 according to how characteristic of the child are each of 17 items. Examples of the items are: "This child interrupts others", and "When this child plays games, s/he is competitive". Since no cut-off scores have been established for Type A or Type B, the present study followed the common practice in the

literature (Corrigan & Moskowitz, 1983; Lawler, et al., 1981; Matthews & Angulo, 1980) of dividing the children into equal thirds to form the three groups of Type A, (children with very high scores) Type B (children with very low scores) and Mixed (children whose scores were neither extremely high nor extremely low).

Test-retest reliability of this tool has been shown to be .87 for a three-month period (Matthews & Angulo, 1980) and .55 for a one-year period (Matthews & Avis, 1983) in school-age children. Lundberg (1983) found a one-year test-retest reliability of .48 in preschoolers: Corrigan and Moskowitz (1983) demonstrated a nine-month test-retest reliability of .99 also in preschoolers.

A number of studies investigating the validity of the MYTH are also available. In general, they all demonstrate the similarity of behaviors of Type A children to those of adults. Not only have children been shown to be similar to adults on measures of the three main behavior categories of competitiveness, aggressiveness and time urgency, but other characteristics such as a lower self-concept and self-esteem, lower tolerance for frustration, a high need to control their environment, and inattention to bodily cues have also been demonstrated in those children (Burnam, Pennebaker, & Glass, 1975; Carver, Coleman, & Glass, 1976; Corrigan & Moskowitz, 1983; Matthews & Angulo, 1980; Matthews & Brunson, 1979; Matthews & Siegel, 1983; Matthews & Volkin, 1981; Weidner & Matthews, 1978).

The child's cardiovascular response to challenge was measured with the Industrial Biomedical Sensors Model 700D. This is an automated blood pressure and pulse monitoring system which uses a programmable test cycle so that blood pressure and pulse measurements can be performed at predetermined time intervals. The reliability and validity of this instrument has been demonstrated to be adequate (DiCarlo, 1983). Four cardiovascular measures were considered as separate dependent variables: systolic blood pressure, diastolic blood pressure, pulse and pulse rate variability. Three blood pressure and pulse measurements were taken at rest and again during the challenge situation. The average of the three measurements was used as the indicator of systolic and diastolic blood pressure and pulse. Pulse rate variability was obtained by computing the standard deviation of the three pulse measurements at rest and during challenge.

Setting and Subjects

The subjects who participated in this study were 144 children enrolled in three metropolitan preschools in the Northwest. All three preschools served primarily middle, and upper middle class Caucasian families. Two of the schools provided all day care and one provided 1/2 day care. Subjects were invited by letter to participate. Respondents included 21 boys and 30 girls from 3 1/2 to 4 1/2 years old; 17 boys and 25 girls from 4 1/2 to 5 1/2 years old; and 33 boys and 18 girls from 5 1/2 to 6 1/2 years old.

Procedure

The study was introduced into each classroom by the researchers who performed a skit demonstrating the "games" which the child would later be invited to play. This skit introduced both the idea of relaxation and the idea of the "Memory Game," later to be used as the "challenge" condition. After the skit, each child was invited individually into an adjoining room where they were met by the researcher and the research assistant. The child was then asked if s/he remembered the "Relaxation Game." When the child was able to demonstrate what appeared to be a relaxed state, the lights were dimmed, soft music was played, and the automated blood pressure machine was set to take three blood pressure and pulse measurements at 10-second intervals. (Such rapid measurements were possible because of the use of the automated B/P machine.) The child was then awarded a "ticket" for successfully completing the "Relaxation Game," and the "Memory Game" was begun. The materials for this game consisted of seven cards displaying an increasing number (2, 3, 6, 9, 12, 24, and 42) of brightly colored animals. The child was first given the practice card displaying two animals. S/he was shown the card for 5 seconds. The card was then taken away, and the child was asked how many animals s/he could remember. It was explained that in the real game the child would receive a ticket for each animal remembered. Then the real game began and the child was shown the

succeeding cards. The tester provided encouragement to keep the child actively engaged in the game. Cardiovascular measurements were taken after the third, fifth, and seventh cards were shown while the child was trying to remember the animals on that card. One tester worked exclusively with the child while the other watched and recorded the digital read-outs on the machine. Both testers were unaware of the child's categorization into Type A, B, or Mixed.

Analysis and Results

In order to categorize children into Type adjusted for Age and Sex, a multiple regression was used to predict the MYTH score that a child would obtain based on Age, Sex, and the Age X Sex Interaction. For each child, a residual score was then computed equal to the actual MYTH score minus the predicted MYTH score. A frequency distribution of these residuals was then divided into thirds to form the three groups of children: Type A (the highest third), Mixed (the middle third), and Type B (the lowest third). Therefore, Type A children exhibit residual scores on the MYTH that are higher than would have been expected from their age and sex and Type B children exhibit lower scores than would have been expected from their age and sex. These groupings were then entered as the independent variable into eight one-way ANOVAs, one for each of the dependent variables at rest and during "challenge" and four one-way ANCOVAs, one of each for the four "challenge"

cardiovascular measures using the corresponding resting measure as a covariate.

In the one-way ANOVAs, there were no significant differences between Type A, Mixed, and Type B children on any of the resting dependent variables (systolic: $F(2,121) = 1.46$ $p = 0.24$; diastolic: $F(2,121) = 0.33$, $p = 0.72$; pulse: $F(2,121) = 1.46$, $p = 0.52$; pulse rate variability: $F(2,118) = 1.61$, $p = 0.20$.

The one-way ANOVAs using "challenge" measurements did indicate one significant difference between Type A, Mixed, and Type B children. The ANOVA using systolic blood pressure as the dependent variable revealed a significant difference between Type A, Mixed, and Type B children ($F(2,119) = 6.07$, $p = 0.0031$). Planned comparisons revealed that the mean challenge systolic blood pressure of the Type A children was significantly higher than that of the Type B children ($t(119) = 3.15$, $p = 0.002$) and that of the Mixed category of children ($t(119) = 2.90$, $p = 0.004$). Type A, Mixed, and Type B children were not significantly different on any of the other "challenge" measures (diastolic: $F(2,119) = .28$, $p = 0.75$; pulse: $F(2,121) = 1.16$, $p = 0.32$; pulse rate variability: $F(2,119) = 0.37$, $p = 0.69$).

In the analyses using ANCOVAs, a difference was again found on systolic blood pressure. With resting systolic pressure used as a covariate, "challenge" systolic blood pressure showed a significant main effect of Type ($F(2,118) = 8.22$, $p = 0.001$).

None of the other ANCOVA's showed significant differences between the Type A, Mixed and Type B children (diastolic: $F(2,118) = 0.16$, $p = 0.88$; pulse: $F(2,119) = 1.00$, $p = 0.37$; pulse rate variability: $F(2,115) = 0.09$, $p = 0.91$). Figure 1 depicts for each cardiovascular measure the mean profiles for Type A, Mixed, and Type B children across the resting and challenge conditions. Note that only the graph for systolic blood pressure represents significant differences due to Behavior Type.

Insert Figure 1 about here

Discussion

The most important finding of this study is that children as young as preschool do exhibit behavior that teachers can categorize into Type A and Type B and that even at this age, children with Type A behavior show a more extreme cardiovascular response to challenge than do Type B children. The specific cardiovascular response that they show (e.g., a higher systolic blood pressure rise in response to challenge) is precisely the response shown by Type A adults (Dembroski, et al., 1979; Glass, et al., 1980; Manuck & Garland, 1979), by Type A college students and adolescents (Dembroski, 1978) and by Type A 10 and 12-year-olds (Lawler, 1981). It has also been shown in preschoolers when presented with a physical challenge (Lundberg,

1983). Although a Swedish study (Bergman & Magnusson, 1986) has demonstrated the consistency of Type A behavior in children between the age of 13 and the age of 27, longitudinal studies beginning earlier and investigating the very early development of this behavior and its cardiovascular correlates are needed. This is particularly important now in view of the fact that studies (Friedman et al., 1984) are beginning to indicate that interventions to prevent recurrence of heart attacks are effective in adult men. If this is the case, it would seem that prevention of cardiac problems in early life would be even more effective.

MSB:vn
TABARTICLE
06/15/87

References

Bergman, L. R., & Magnusson, D. (1986). Type A behavior: A longitudinal study childhood to adulthood. Psychometric Medicine, 48(1/2): 134-142.

Burnam, M. A., Pennebaker, J. W., & Glass, D. C. (1975). Time consciousness, achievement-striving and the Type A coronoary prone pattern. Journal of Abnormal Psychology, 84, 76-79.

Butensky, A., Faralli, V., Heebner, D., & Waldron, I. (1976). Elements of the coronary prone behavior pattern in children and teen-agers. Journal of Psychosomatic Research, 20, 439-444.

Carver, C. S., Coleman, A. E., & Glass. (1976). The coronary-prone behavior pattern and the suppression of fatigue on the treadmill test. Journal of Personality and Social Psychology, 33, 460-466.

Cooper, T., Detre, T., & Weiss, S. M. (1981). Coronary prone behavior and coronary heart disease: A critical review. Circulation, 63, 1199-1215.

Corrigan, S. A., & Moskowitz, D. S. (1983). Type A behavior in preschool children: Construct validation evidence for the MYTH. Child Development, 54, 1513-1521.

Dembroski, T. M., MacDougall, J. M., Sheilds, J. L., Petitto, J., & Lushene, R. (1978, June). Components of the Type A coronary-prone behavior patterns and cardiovascular responses to psychomotor challenge. Journal of Behavioral Medicine, 1, 158-176.

Dimsdale, J. E., Hackett, T. P., Hutter, A. M., Block, P., & Catanzano, D. (1978). Type A personality and extent of coronary atherosclerosis. American Journal of Cardiology, 42, 583-586.

DiCarlo, S. (1983). Accuracy of resting heart rate, and blood pressure measured by an automated system. Unpublished Document.

Friedman, M., Thorensen, C. E., Gill, J. J., Powell, L. H., Ulmer, D., Thompson, L., Price, V. A., Rabin, D. D., Breall, W. S., Dixon, T., Levy, R., & Bourg, E. (1984). Alteration of type A behavior and reduction in cardiac recurrences in postmyocardial infarction patients. American Heart Journal, 108(2), 237-245.

Glass, D. C. (1977). Behavior patterns, stress, and coronary disease. Hillsdale, NJ: Lawrence Erlbaum Assoc.

Glass, D. C., & Contrada, R. J. (1982). Type A behavior and catecholamines: A critical review. In C.R. Lake and M. Ziegler (Eds.), Norepinephrine: Clinical Aspects. Baltimore: Williams and Wilkins.

Glass, D. C., Krakoff, L. R., Contrada, R., Hilton, W. F., Kehoe, K., Mannucci, E. G., Collins, C., Snow, B., & Elting, E. (1980). Effect of harrassment and competition upon cardiovascular and plasma catecholamine responses in Type A and B individuals. Psychophysiology, 17, 453-463.

Houston, B. K. (1983). Psychophysiological responsivity and the Type A behavior pattern. Journal of Research and Personality, 17, 22-39.

Hunter, S. M., Wolf, T. M., Sklov, M. C., Webber, L. S., Watson, R. M., & Berenson, G. S. (1982). Type A coronary-prone behavior pattern and cardiovascular risk factor variables in children and adolescents: The Bogalusa Heart Study. Journal of Chronic Diseases, 35, 613-621.

Jenkins, C. D., Zyzanski, S. J., & Rosenman, R. H. (1971). Progress toward validation of a computer-scored test of the Type A coronary-prone behavior pattern. Psychosomatic Medicine, 33, 192-202.

Jenkins, C. D. (1976). Recent evidence supporting psychologic and social risk factors for coronary disease. New England Journal of Medicine, 294, 987-994, 1033-1038.

Jenkins, C. D., Zyzanski, S. J., & Rosenman, R. H. (1978). Coronary-prone behavior. One pattern or several? Psychosomatic Medicine, 40, 25-34.

Lawler, K. A., Allen, M. T., Critcher, E. C., & Standard, B. A. (1981). The relationship of physiological responses to the coronary-prone behavior pattern in children. Journal of Behavioral Medicine, 4, 203-216.

Lundberg, U. (1983). Note on Type A behavior and cardiovascular responses to challenge in 3-6 year old children. Journal of Psychosomatic Research, 27, 39-42.

Manuck, S. B., & Garland, F. N. (1979). Coronary-prone behavior pattern, task incentive, and cardiovascular response. Psychophysiology, 16, 139-142.

Matthews, K. A. (1977). Caregiver-child interactions and the Type A coronary-prone behavior pattern. Child Development, 48, 1725-1756.

Matthews, K. A. (1982). Psychological perspectives on the Type A behavior pattern. Psychological Bulletin, 91, 293-323.

Matthews, K. A., & Angulo, J. (1980). Measurement of the Type A behavior pattern in children: Assessment of children's competitiveness, impatience- anger, and aggression. Child Development, 51, 466-475.

Matthews, K. A., & Avis, N. E. (1983). Stability of overt Type A behaviors in children: Results from a one-year longitudinal study. Child Development, 54, 1507- 1512.

Matthews, K. A., & Brunson, B. I. (1979). Allocation of attention and the Type A coronary-prone behavior pattern. Journal of Personality and Social Psychology, 37, 2081-2090.

Matthews, K. A., & Siegel, J. M. (1983). Type A behaviors by children, social comparison, and standards for self-evaluation. Developmental Psychology, 19, 135-140

Matthews, K. A., & Volkin, J. I. (1981). Efforts to excel and the Type A behavior pattern in children. Child Development, 52, 1283-1289.

Murray, D. M., Matthews, K. A., Blake, S. M., Prineas, R. J., & Gillum, R. F. (1986). Type A behavior in children: demographic, behavioral, and physiological correlates. Health Psychology, 5(2), 159-169.

The Review Panel on Coronary-Prone Behavior and Coronary Heart Disease. (1981). Coronary-prone behavior and coronary heart disease. A critical review. Circulation, 63, 1199.

Rosenman, R. H., Brand, R. J., Jenkins, C. D., Friedman, M., Strauss, R., & Wurm, M. (1975). Coronary heart disease in the Western Collaborative Group Study: Final follow-up experience of 8 1/2 years. Journal of American Medical Association, 223, 872-877.

Siegel, J. M., & Leitch, C. J. (1981). Assessment of the Type A behavior pattern in adolescents. Psychosomatic Medicine, 43, 45-56.

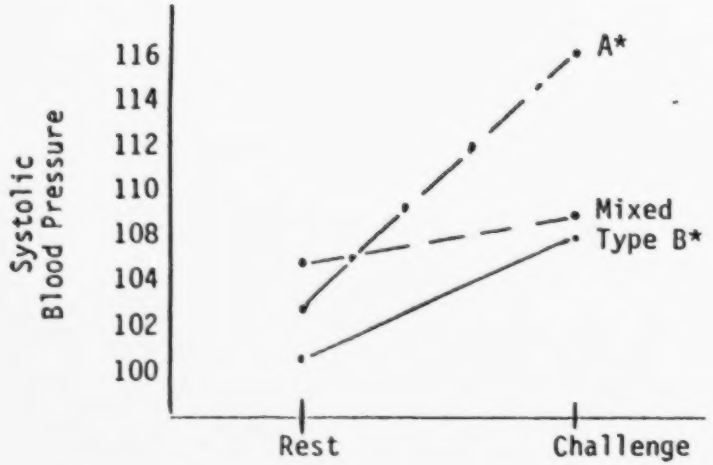
Sweda, M. G., Sines, J. O., Lauer, R. M., & Clarke, W. R. (1986). Familial aggregation of type A behavior. Journal of Behavioral Medicine, 9(1), 23-32.

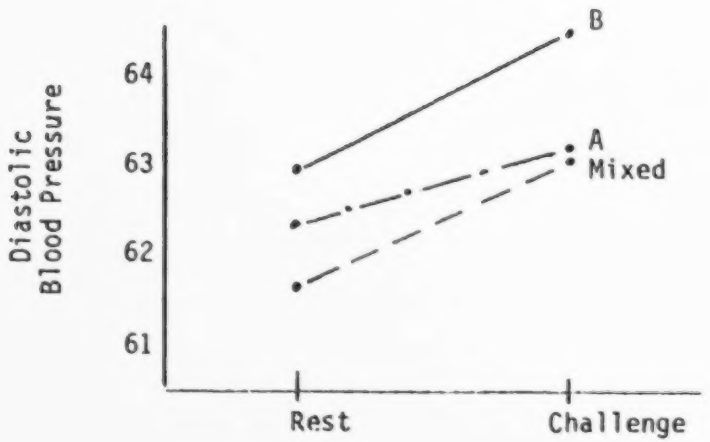
Weidner, G., & Matthews, K. A. (1978). Reported physical symptoms elicited by unpredictable events and the Type A coronary-prone behavior pattern. Journal of Personality and Social Psychology, 36, 1213-1220.

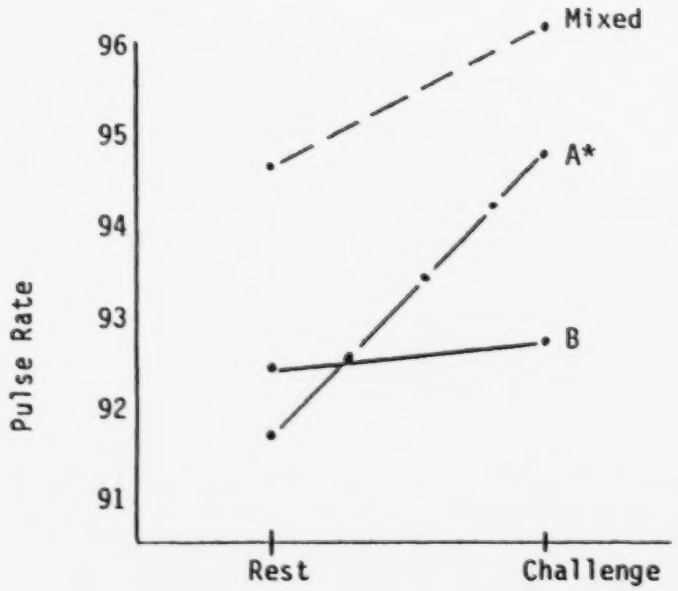
Wolf, T. M., Hunter, S. M., & Webber, L. S. (1979). Psychosocial measures and cardiovascular risk factors in children and adolescents. Journal of Psychology, 101, 139-146.

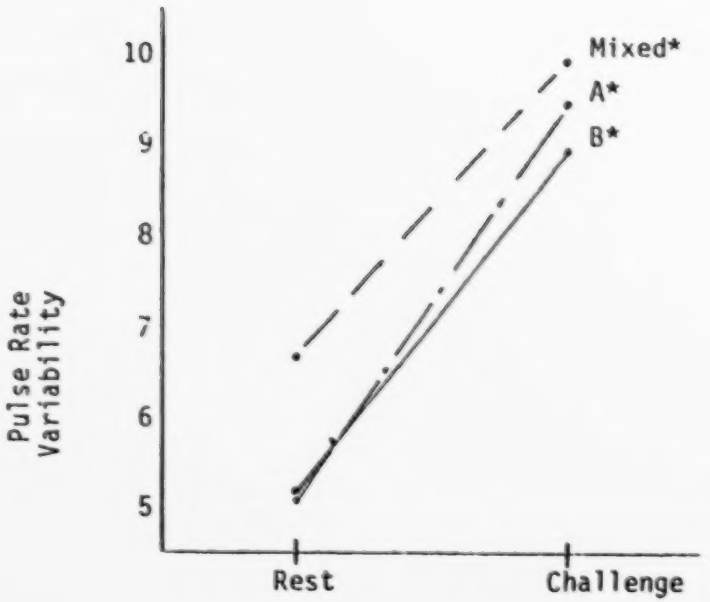
Figure Caption

Figure 1. Mean profiles for Type A, Mixed and Type B children for each cardiovascular measure across resting and challenge.









* $p < .05$, Paired t Tests